Exhibit B

Part I

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UNITED STATES DISTRICT COURT
FOR THE DISTRICT OF MASSACHUSETTS

THE TRUSTEES OF COLUMBIA UNIVERSITY IN THE CITY OF NEW YORK,
Plaintiff,

v.

ROCHE DIAGNOSTICS GmbH, formerly known as BOEHRINGER MANNHEIM GmbH,
Defendant.

C.A. No. 93-11512-NG

GERTNER, D.J.

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FINDINGS OF FACT/CONCLUSIONS OF LAW
September 30, 2002

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I. INTRODUCTION

This case involves an allegation by plaintiff Columbia University ("Columbia") of patent infringement against defendant Roche Diagnostics GmbH (formerly Boehringer Mannheim, GmbH) ("Roche"), a multinational pharmaceutical corporation having its principal place of business in Mannheim, Germany. In essence, Columbia claims that Roche induced or otherwise collaborated with Genetics Institute ("GI"), a United States company based in Cambridge, Massachusetts, to produce the drug Erythropoietin ("EPO")[1] using methods and products for which Columbia holds the patents. Columbia also alleges that Roche, without proper

[1] EPO is useful in treating end stage renal disease.

authority, imported into the United States products made by its patented processes.

The dispute revolves around U.S. Patent Nos. 4,399,216 ("the '216 patent"),[2] 4,634,665 ("the '665 patent"),[3] and 5,179,017 ("the '017 patent")[4] (collectively referred to as the "Axel patents").[5] When Columbia obtained the first of the Axel patents, it broke new ground: It identified a process to produce important proteins, including glycoproteins such as EPO, by genetic engineering. But while the Axel patents have had a significant effect on the field of biotechnology over the last twenty years, the end of the patents' protection is near; the first will expire in 2003.

The Axel patents cover processes for inserting two genes into a host cell ("cotransformation") in which one of the genes encodes a marker protein, and the other gene encodes a protein of interest.[6] The claims also cover the cell lines produced by the

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[2] The '216 patent was issued on August 16, 1983.

[3] The '665 patent was issued on January 6, 1987.

[4] The '017 patent was issued on January 12, 1993.

[5] Columbia initially brought this action against Roche for infringement of the '216 patent and the '665 patent, both entitled "Processes for Inserting DNA into Eucaryotic cells and for Producing Proteinaceous Materials." Columbia added a claim of infringement of the third patent with the same title, the '017 patent, in its Second Amended complaint.

[6] The inventors named on all three patents are Drs. Richard Axel, Saul Silverstein, and Michael Wigler (hence "the Axel patents").

process of amplification and cotransformation, variously described hereafter as the EPO generating Chinese Hamster Ovary ("CHO") host cell, the production clone, or DN2-3α3. See Trustees of Columbia University in the City of New York v. Roche Diagnostics GmbH, 126 F. Supp. 2d 16 (D. Mass. 2000).[7] However, the claims do not cover the protein of interest itself that is produced by the cell, EPO.

On December 11, 2000, I issued a Markman decision that construed key claim language in the Axel patents. Most crucially, based upon an analysis of the intrinsic evidence, I adopted Columbia's interpretation of the phrase "dominant selectable phenotype" found in claim 54 of the '216 patent.[8] Id.

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[7] From Markman v. Westview Instruments, Inc., 52 F.3d 967, 979 (Fed. Cir. 1995) (en banc), aff'd, 517 U.S. 370 (1996).

[8] Claim 54 of the '216 patent states:

> A process for generating a multiplicity of foreign DNA I molecules corresponding to multiple copies of a gene in a cell with a molecule which comprises transforming said eucaryotic cell with a molecule which is formed by linking one of said DNA I molecules to a DNA II molecule corresponding to an amplifiable gene for a dominant selectable phenotype not expressed by said eucaryotic cell, and culturing the transformed eucaryotic cells in the presence of successively elevated concentrations of an agent permitting survival or identification of eucaryotic cells which have acquired multiple copies of said amplifiable gene, said transformation and culturing being carried out under suitable conditions.

I construed the phrase "dominant selectable phenotype" as follows: "A selectable phenotype which allows an organism or a cell of a defined genotype that acquires such phenotype, e.g. as a result of introducing a gene at a suitable copy number, to survive while other organisms or cells of the same defined genotype which have not acquired such phenotype will not survive or

at 31. In addition, construing conflicting Federal Circuit precedent, I found that the product-by-process claims were not limited to the product prepared by the process set forth in the claims of the Axel patents. Id. at 31-32.

On April 27, 2001, I resolved motions for summary judgment. See Trustees of Columbia University in the City of New York v. Roche Diagnostics GmbH, 150 F. Supp. 2d 191 (D. Mass. 2001). I granted summary judgment in favor of Roche on Columbia's claims of direct infringement under 35 U.S.C. 271(a) because there was no evidence that any infringing activities by Roche had occurred in the United States. Id. at 201-204. I also found that Roche's exporting of EPO and an EPO-generating cell line did not violate 35 U.S.C. 271(f), which prevents companies from circumventing the U.S. patent laws by exporting non-infringing components to be assembled abroad into a infringing final product. Roche's actions were beyond the intended scope of liability under Section 271(f). Id. at 204-205.

However, on the question of whether Roche was liable under 35 U.S.C. § 271(b) for inducing GI to infringe the Axel patents, I found that disputed questions of material facts remained.[9]

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proliferate."

[9] I also denied Roche's request for summary judgment on the issue of non-infringement of claims to unlinked DNA embodiments because I found, based on my interpretation of the language of the Axel Patents (embodied in my Markman findings), that subject matter that is alleged to infringe claims to

A jury waived trial was held before me on July 10, 2001, through July 31, 2001.

II. FINDINGS OF FACT

A. The Axel Patents

The Axel patents relate to processes for inserting two genes -- a DNA I expressing a protein of interest and a DNA II expressing a protein conferring a selectable phenotype -- into a recipient cell whereby the recipient cell incorporates and expresses both of the genes and makes the proteins encoded by the genes. The process of inserting these genes into a recipient cell whereby each of the genes is expressed is referred to as "cotransformation."

In addition, because the DNA II encodes a selectable phenotype, and cells that do not express DNA II will not survive, one can select for cells that incorporate and express DNA II. Thus, the Axel patents allow for the selection of cells which have successfully incorporated the gene encoding the protein of interest (DNA I). The Axel patents also disclose that if the DNA I and DNA II are genetically linked, then amplifying (i.e.,

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linked DNA may literally infringe claims drawn to unlinked DNA. I have subsequently revised my Markman findings with respect to the terms "linked" and "unlinked." See Section III(A)(1)(a), infra. This change inescapably leads to a conclusion that GI did not literally infringe any of the unlinked claims, and therefore, Roche did not induce GI to infringe any of these claims. See Section III(A)(1)(b), infra.

increasing the number of copies of the gene) DNA II will also amplify DNA I.

For a more detailed description of the Axel patents and its claims, see Trustees of Columbia University, 126 F. Supp. 2d. at 17-22.

B. The Acts At Issue

In April 1982, GI embarked upon a project to isolate the EPO gene, insert it into recipient cells, and express it in those cells. GI subsequently solicited pharmaceutical companies to help fund its research and commercialize its products worldwide. Trial Exhibits ("Trial Exs.") P138, P139. In June 1984, GI reached an agreement with Chugai Pharmaceutical Company, Ltd. ("Chugai") (the "GI-Chugai License Agreement"), in which the parties agreed to collaborate to "undertake a research and development project utilizing recombinant DNA technology for producing erythropoietin on a commercially feasible basis." Trial Ex. P142 at ¶ 2. In return for Chugai's funding of GI's research and royalty payments, GI granted a license to use GI's EPO-related patented technology and scientific knowledge to commercialize EPO in the United States, Canada, Mexico, Japan, and other Asian countries.

GI also sought a partner to develop and commercialize EPO in Europe, a territory excluded from the GI-Chugai License

Agreement. In the fall of 1984, GI began discussions with Roche to accomplish this goal as well as with at least two other large European pharmaceutical companies. Trial Transcript ("Trial Tr.") 999-1000. On January 2, 1985, GI and Roche executed a confidentiality agreement to assist their negotiations. Trial Ex. P148. By March 19, 1985, Roche's Board of Directors had "agreed in principle" to an outline of a deal between GI and Roche. Trial Ex. P24. The details of the deal had not yet been finalized; instead, the outline was merely "a good basis for [the parties'] next, more detailed discussions" that would be held later in the year. Id. at p. 3.

The parties eventually agreed to a deal on October 8, 1985, in a Development & License Agreement ("GI-Roche D&L Agreement"). Trial Ex. P29. The GI-Roche D&L Agreement stated, in part:

> [Roche] desires that GI, on behalf of and in collaboration with [Roche], [will] undertake a research and development project utilizing recombinant DNA technology for producing erythropoietin on a commercially feasible basis for use in humans. In return for certain rights under the patents and know-how developed by GI, [Roche] will financially support the research and development activities of GI and will pay GI the royalties provided for herein.

Id. at p. 1. As a part of the GI-Roche D&L License Agreement, Roche agreed to fund GI's research and development. Id. at ¶3.1. "In consideration of the research, development, and related

activities undertaken by GI with regard to the project," Roche agreed to pay GI a series of non-refundable research fees when GI reached certain development benchmarks. Id. The Agreement also authorized the exchange of confidential trade secrets and included a provision for joint ownership: "the Parties shall own jointly the entire right, title and interest in and to all patent and other rights in any product method or apparatus conceived, reduced to practice or developed jointly by GI and BM in the course of the Project." Id. at ¶¶ 2.6 & 5.3. Finally, the Agreement provided that neither party was permitted to produce "any publicity, news release or other public announcement, written or oral, relating to this Agreement, the Project or the existence of an arrangement between the parties without the prior written approval of the other Party . . . ." Id. at ¶ 10.2.

1. Manufacture of the Production Clone

Weeks before the signing of the GI-Roche D&L Agreement on October 8, 1995, GI began making the EPO production clone DN2-3α3, 10 micromolar. Trial Tr. 498-500. GI had an outstanding obligation to Chugai to produce the EPO production clone under the GI-Chugai License Agreement. On October 10, 1985, the production clone was transferred from the cell line production lab to the cell culture lab to be adapted to grow in suspension culture. Trial Ex. P171 at p. 44.

The DN2-3α3, 10 micromolar production clone was the source for both a master cell bank ("MCB") and master working cell bank ("MWCB"). After the production clone was adapted to grow in suspension, a small quantity of those cells produced from the production clone were grown in a large vat in October 1985. Then, GI created the MCB by taking small amounts of the cells from the vat and freezing and storing these cells in individual vials. Trial Tr. 723-724. The MCB was "laid down," meaning the cells were frozen and put in vials, on December 4, 1985. Trial Tr. 452-453.

Out of the two to three hundred vials of the MCB, one was thawed and in two weeks, grew into a larger quantity of cells. These cells, referred to as the MWCB, were then again divided into small portions, put into individual vials, and frozen on December 18, 1985. Trial Tr. 764-765.

The production of the DN2-3α3, 10 micromolar production clone, the MCB, and the MWCB was all done exclusively by GI. Trial Tr. 510. Roche had no involvement with the specifics of GI's production of these items. No detailed technical information concerning the production of the clone, the MCB, or the MWCB was passed from GI to Roche until November 1985, or after the signing of the GI-Roche D&L Agreement. Trial Tr. 437.

The cells of the MWCB were used to make bulk EPO, which GI later shipped to Roche in Europe. To make bulk EPO, GI would thaw one of the vials of the MWCB and grow the cells under certain culture conditions in a large tank with a stirring rod. Trial Tr. 723-727. Nutrients and media were fed into the tank by GI, and the cells, floating in suspension, were in the solution. Id. During the entire growth process, EPO was expressed first inside the cells and subsequently secreted outside of the cells into the medium in the tank. Id. Then, on a routine basis, GI removed a portion of the media containing the EPO into a new tank, where GI separated the cells away from the solution. Id. Finally, the solution went through a series of purification steps until only the pure EPO molecule remained.

On February 24, 1986, GI shipped vials of the MCB and the MWCB of the DN2-3α3, 10 micromolar EPO production clone to Chugai in Japan pursuant to the GI-Chugai License Agreement. Trial Ex. P152; Trial Tr. 506-507. On March 4, 1986, GI sent 15 vials of the MCB and 15 vials of the DN2-3α3, 10 micromolar EPO production clone to Roche in Germany. Trial Ex. P112 at B100793. In July 1986, GI sent its first shipment of good manufacturing practice ("GMP") bulk EPO to Roche in Germany.[10] Trial Ex. P114.

[10] Good manufacturing practices or "GMP" are essentially a set of guidelines established by the Food and Drug Administration and other regulatory authorities that ensure that the product is of a sufficiently high

From July 1986 until 1991, when GI was enjoined from making EPO in Amgen v. Chugai Pharmaceutical Co., Ltd., 13 U.S.P.Q. 2d 1737 (D. Mass. 1989), aff'd in part, 927 F.2d 1200 (Fed. Cir. 1991), GI produced bulk EPO which it shipped to Roche in Germany.[11] After GI provided the bulk EPO to Roche in Europe, Roche was responsible for finishing the clinical development of the drug in Europe and for commercializing EPO in Europe.

2. **Shipment Of "Bailed" EPO Production Cells**

In September 1987, GI shipped certain "bailed" cells to Roche in Germany. Trial Exs. P180 & P181. These cells consisted of twelve vials of MCB, six vials of MWCB, four vials of EPO producing cells in a serum-free medium, and twelve vials of other EPO producing clones. Id. Although Roche agreed to keep these cells for GI as "'insurance' in the event of unfavorable legal/patent developments in the U.S.," the parties agreed that the cells would remain GI's exclusive property. Trial Ex. P181. In early 1989, Roche returned 6 vials to GI by shipping them to GI in the United States at GI's request.

3. **Shipment Of Albumin-Free EPO**

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quality for human use.

[11] In October 1987, Amgen, Inc. sued GI (along with Chugai) and alleged that GI's process for producing EPO infringed its patent on cloning the EPO gene. Pursuant to this action, in 1991, GI was enjoined from making EPO.

In March 1989, using bulk EPO which GI had created from the DN2-3α3, 10 micromolar production clone and had shipped to Roche earlier, Roche formulated some albumin-free EPO for use by GI in a clinical trial involving Jehovah's Witnesses in the United States. Trial Ex. P293; Trial Tr. 446-450. For religious reasons, the Jehovah's Witnesses did not wish to use ordinary EPO, which contained human or animal derived blood products. GI administered this albumin-free EPO to Jehovah's Witness patients as a "compassionate treatment" in the United States, and Roche received no revenue from GI as a result of the shipment. Id.

4. Freezing Of the EPO Production Clone

Since the 1991 Amgen Injunction enjoining GI from making, using, or selling EPO, GI has kept its EPO production clone frozen in a state of suspended animation using liquid nitrogen. It was GI's decision to keep these cells frozen. Trial Tr. 482.

III. LEGAL ANALYSIS

A. Infringement

Columbia argues that Roche is liable for patent infringement under two theories. First, Columbia claims that Roche violated 35 U.S.C. 271(b) ("Section 271(b)") by inducing GI to infringe the Axel patents. Also, Columbia argues that Roche directly infringed the Axel patents under 35 U.S.C. 271(g) ("Section

271(g)") by improperly importing into the United States a product made by a process patented in the United States.

Under either theory, Roche's liability depends on GI's. It is liable only if GI's underlying actions directly infringed the Axel patents. Under Section 271(b), if there is no direct infringement by GI, Roche cannot be liable for inducing infringement. See Fina Research, S.A. v. Baroid Limited, 141 F.3d 1479, 1484 (Fed. Cir. 1998) (holding that "direct infringement is a prerequisite to inducing infringement"). Under Section 271(g), Roche can only be held responsible if it imported a product made by a patented process into the United States. See 35 U.S.C. 271(g). If the product shipped by Roche into the United States was made by a process that did not directly infringe upon Columbia's patents, then Roche cannot have violated Section 271(g).

I will first address whether GI directly infringed the Axel patents with its actions before considering whether Roche induced this infringement under Section 271(b) or imported a product made by Columbia's patented process under Section 271(g).

1. **Did GI Directly Infringe The Axel Patents?**

a. Revision of Markman Findings With Respect To The Terms "Linked" and "Unlinked"

Before I reach the question of whether GI directly infringed any of Columbia's patents, I must revise my earlier Markman definitions of the terms "linked" and "unlinked" as used in the Axel patents. (I note at the outset, that the issue of the precise meaning of "linked" and "unlinked" was not briefed as carefully as other issues at the Markman stage). I have reviewed intrinsic evidence of the claims themselves, the patent specification, and the prosecution history. See Vitronics Corp. v. Conceptronic, Inc., 90 F.3d 1576, 1582 (Fed. Cir. 1996) (identifying the intrinsic evidence as "the most significant source of legally operative meaning of the disputed claim language.") After first reviewing the intrinsic evidence and determining that this evidence was not unambiguous, I looked to the extrinsic evidence as well.

In my Markman findings, I defined "linked" as "[p]hysically and chemically joining DNA I and DNA II into the same piece of contiguous DNA prior to their insertion into the eucaryotic cell Mammalian Cell." Trustees of Columbia University in the City of New York v. Roche Diagnostics GmbH, 126 F. Supp. 2d 16, 33 (D. Mass. 2000). In contrast, I defined "unlinked" as "[n]ot physically or chemically linked on the same piece of contiguous DNA." Id. at 34.

Virtually every scientist -- including Dr. Weinberg, produced by Columbia -- who testified in this case suggested that the Court's definition did not comport with the accepted scientific definitions of these terms. Trial Tr. 423; 923-924. Columbia correctly notes that I must construe these terms according to the standard of what these words would have meant to a person having ordinary skill in the art at the time of the application for the patent. W.L. Gore & Associates, Inc. v. Garlock, Inc., 721 F.2d 1540, 1556 (Fed. Cir. 1983). However, Columbia presents no compelling intrinsic or extrinsic evidence to support its interpretation that the terms "linked" and "unlinked" refer only to whether the two DNA strands were linked in nature and not simply if they were linked at the moment of their insertion into a eucaryotic cell.

As a result, I amend my Markman findings as follows: The distinction made in the patents as between linked and unlinked DNA refers to the status of the DNA I and DNA II cells at the moment of their insertion into a eukaryotic cell.[12]

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[12] I formally construe the disputed claim language as follows:

"Linked" -- "Physically and chemically joining DNA I and DNA II into the same piece of contiguous DNA at the moment of their insertion into the eucaryotic cell."

"Unlinked" -- "Not physically or chemically linked on the same piece of contiguous DNA at the moment of insertion into the eucaryotic cell."

b. Did GI Directly Infringe Any Of The Unlinked Claims?

(1) Literal Infringement

Generally, a claim is literally infringed only if each properly construed claim element reads on the accused product or process. See Cortland Line Co. v. Orvis Co., 203 F.3d 1351, 1358 (Fed. Cir. 2000); Atlantic Thermoplastics Co., Inc. v. Faytex Corp., 970 F.2d 834 (Fed. Cir. 1992). Changing my earlier Markman definitions of "linked" and "unlinked" to recognize that these terms refer to whether the DNA I and DNA II were linked at the moment of their insertion into the eucaryotic cell directly affects the literal infringement analysis with respect to the unlinked cotransformation claims. The allegedly infringing acts committed by GI involve the use of only two DNAs -- a DNA I encoding EPO and a DNA II encoding Dihydrofolate Reductase ("DHFR") -- which were joined by cotransformation prior to their insertion into the eucaryotic cell. Thus, GI could not have literally infringed any of the unlinked claims of the Axel patents. In other words, because GI's processes involved only linked cotransformation, GI could not have literally infringed any of the unlinked cotransformation claims of the Axel patents.

This conclusion revises my earlier finding on summary judgment concerning non-infringement of claims involving unlinked DNA. See Trustees of Columbia University in the City of New York

v. Roche Diagnostics GmbH, 150 F. Supp. 2d 191, 209-210 (D. Mass. 2001).[13] The DN2-3α3, 10 micromolar production clone made by GI was made using only linked DNA. The DNA I encoding the EPO gene and the DNA II encoding the DHFR gene were physically linked on the same plasmid prior to insertion into the eucaryotic cell. As such, GI could not have literally infringed any of Columbia's claims involving unlinked cotransformation. Therefore, the only claims at issue with regard to literal infringement are claim 54 of the '216 patent and its dependant claims.

(2) Doctrine Of Equivalents

Although GI did not literally infringe the unlinked cotransformation claims, the doctrine of equivalents could apply to GI's processes with respect to these claims. The doctrine of equivalents allows a court to find infringement when an accused product or process is the substantial equivalent of a patented invention or process. See Warner-Jenkinson Co., Inc. v. Hilton Davis Chemical Co., 520 U.S. 17 (1997). The essential inquiry is whether the accused product or process contains elements identical or equivalent to each claimed element of the patented invention. Id. at 40.

[13] While amplification processes remain a principal difference between the linked and unlinked claims of the Axel patents, see Trustees of Columbia University in the City of New York, 150 F. Supp. 2d at 209-210, the linkage of the two DNAs at the moment of insertion is also crucial.

Specifically, Roche focuses on the prosecution history of the '216 patent. Roche argues that Columbia's statements before the PTO during the prosecution of the '216 patent relinquished any claim that linked cotransformation infringes by equivalents the unlinked cotransformation claims of the Axel patents.

Before I address Roche's claims, however, I must address the question of which party bears the burden of proof in this instance. Where the patentee is seeking to broaden the scope of the literal terms of his patent through the doctrine of equivalents, he or she bears the burden of showing that amendments made to his claim during the prosecution history did not relinquish the particular equivalent he identifies as infringing, at least where he made the amendment for a substantial reason relating to patentability. Festo Corp. v. Shoketsu Kinzoku Kogyo Kabushiki Co., Ltd., 122 S. Ct. 1831, 1841-42 (2002); Gentile v. Franklin Sports, Inc., 211 F. Supp. 2d 334, 336-338 (D. Mass. 2002). The patentee bears a similar burden with regard to arguments or statements made to the Patent and Trademark Office ("PTO") for a substantial reason relating to patentability. Id.; Pharmacia & Upjohn Co. v. Mylan Pharmaceuticals, Inc., 170 F.3d 1373, 1376-77 (Fed. Cir. 1999); Cybor Corp. v. FAS Technologies, Inc., 138 F.3d 1448, 1460 (Fed. Cir. 1998) (en banc). However, for such an estoppel to apply,

the statements made by Columbia to the PTO must clearly have surrendered the subject matter in question. Pharmacia & Upjohn Co., 170 F.3d at 1376-77.

Having these standards in mind, I find as follows: During the prosecution of Columbia's '216 patent, the PTO Examiner rejected claims covering unlinked cotransformation and transformed cells obtained by unlinked cotransformation on the ground that these claims would have been obvious to a person having ordinary skill in the art in light of the teachings of Kretschmer, et al. and Mantei, et al. Columbia attempted to distinguish their claims involving unlinked cotransformation from the teachings of the Mantei, et al. article by arguing that "the Mantei, et al. article involves linked DNA which is distinguishable from Applicant's unlinked DNA." Trial Ex. P288 at 216-154. Later in the same document submitted to the PTO to overcome the Examiners' objections with respect to the Mantei, et al. article, Columbia "reiterate[d] their position that use of linked DNA is patentably distinguishable from their claimed invention." Id. at 216-155.

Despite Columbia's protestations to the contrary, its representations to the PTO that its claims involving unlinked cotransformation were "patentably distinguishable" from the use of linked DNA in the prior art is a sufficiently clear surrender

of the subject matter necessary to trigger estoppel here. Having clearly distinguished between the use of linked and unlinked DNA before the PTO in order to overcome an objection by the Patent Examiner (indisputably a substantial reason relating to patentability), Columbia cannot now claim that the two are substantially equivalent.

Because GI did not directly infringe any of the unlinked cotransformation claims of the Axel patents, either literally or through the doctrine of equivalents, Roche is not liable for inducing GI to infringe any of the unlinked claims. Thus, Roche did not infringe claims 1, 2, 9, 10, 11, 14, 15, 18-22, 24-28, 30-32, 39, 41, 42, 44-51, and 53 of the '216 patent or claims 1, 3-5, 7, 10-18, and 21-23 of the '665 patent under Section 271(b) or Section 271(g).

c. **Did GI Directly Infringe Any of the Linked Claims (Claims 54-73 Of The '216 Patent)?**

Roche interprets the language of claims 54-73 of the '216 patent to require cotransformation using a "DNA II molecule corresponding to an amplifiable gene for a dominant selectable phenotype." Roche asserts that "in claim 54, it is the selection step that requires the use of an amplifiable gene encoding a 'dominant' selectable phenotype. It is not the amplification step." Roche Post-Trial Memorandum at 19. In other words, Roche suggests that, according to the Axel patents, amplification must

be part of the process by which the dominant phenotype is selected.

In contrast, Roche argues that GI's processes do not infringe because in GI's approach, only a single copy of the DHFR gene was used in each cell to confer selectability. The DNA I (EPO) was ligated to DNA II (DHFR) and inserted into a DHFR deficient cell. GI, it suggests, performed amplification only after this selection stage. Thus, the amplification of the DHFR gene did not effect the selection of the DHFR gene. Because GI utilized a process in which selection of cotransformants was based on a single copy of DHFR, and not the amplification process, GI did not infringe claim 54 of the '216 patent.[14]

Roche's arguments are based upon an incorrect premise -- that this Court interpreted the claims to require that it was the amplification process that enabled the DNA II gene to become dominant. The language of claim 54 does not require that the amplification step cause dominance; instead, to be covered by claim 54, the DNA II must only correspond to an amplifiable gene for a dominant selectable phenotype. It is undisputed that the

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[14] Roche also argues that GI's process was fundamentally different than the process described in claim 54 because the DHFR marker gene used by GI could not be used as a dominant selectable marker. It was too weak to dominate over the host DHFR gene. As such, the process did not involve the use of a "DNA II molecule corresponding to an amplifiable gene for a dominant selectable phenotype."

However, nothing in claim 54 suggests that "dominance" should be interpreted so narrowly.

DHFR gene is an amplifiable gene and that it is covered by the language of the Axel patents as an "amplifiable gene for a dominant selectable phenotype."[15]

As a result, GI's process of creating its EPO production clone by inserting the linked EPO gene and DHFR gene into the cell and then amplifying the copies of the genes by exposing them to successively elevated concentrations of methotrexate infringed claim 54 of the '216 patent. The bulk EPO made by GI to ship to Roche in Europe between 1986 and 1991 infringed claim 54 of the '216 patent and its dependent process claims (claims 55, 62, 64-65, and 69-71 of the '216 patent) as well as the product-by process claims (claims 72 and 73). Trial Tr. 424-25, 563-64, 720, 838-852, 969-970. If Roche induced GI to make this bulk EPO with the requisite specific intent (see Section III(A)(2)(b), infra), Roche will be liable for inducing this infringement under Section 271(b) unless it prevails on one of its affirmative defenses.

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[15] Roche also repeats its argument from the Markman proceedings that the phrase "DNA II molecule corresponding to an amplifiable gene for a dominant selectable phenotype" should be construed as "a gene which is amplifiable and expresses a protein that confers on a eucaryotic wild type cell the ability to survive in culture medium lethal to the eucaryotic wild type cell." In my Markman opinion, I rejected this proposed construction, finding that it was "unsupported by the intrinsic evidence, including the prosecution history." Trustees of Columbia Univ., 126 F. Supp. 2d at 31. I find no reason to change my earlier construction or to accept Roche's conclusions here.

In addition, both the "bailed" MWCB cells and the albumin-free EPO that Roche returned to GI in the United States in 1989 were likewise made with a process that directly infringed claims 54-55, 62, 64-65, and 69-71 of the '216 patent. As a result, if Roche "import[ed]" these products to GI in the United States without Columbia's authority, it will be liable for infringement under Section 271(g) if it does not prevail on one of its affirmative defenses.

2. Did Roche Induce GI to Commit Any of the Allegedly Infringing Acts?

Under the statute, anyone who induces another to infringe a patent is also liable as an infringer. See 35 U.S.C. § 271(b) ("Section 271(b)") (providing that "[w]hoever actively induces infringement of a patent shall be liable as an infringer.") To prove that a defendant has induced infringement, a plaintiff must demonstrate "that the alleged infringer's actions induced infringing acts and that he knew or should have known his actions would induce actual infringements." Manville Sales Corp. v. Paramount Systems, Inc., 917 F.2d 544, 553 (Fed. Cir. 1990). In addition, the plaintiff must demonstrate that the alleged infringer knowingly induced infringement with "a specific intent to encourage another's infringement and not merely that the defendant had knowledge of the acts alleged to constitute infringement." Id.

In effect, this statute is analogous to a criminal statute imposing liability for one who acts as an accessory before the fact. Sims v. Western Steel Co., 551 F.2d 811, 817 (10th Cir. 1977) ("This subsection contemplates that the inducer shall have been an active participant in the line of conduct of which the actual infringer was guilty. Thus he should be in the nature of an accessory before the fact.")[16] While the plaintiff need not prove that the defendant exercised control over the third party infringer's actions to support a finding of inducement liability, VLT Corp. v. Unitrode Corp., 130 F. Supp. 2d 178, 200-201 (D. Mass. 2001), he must demonstrate by either direct or circumstantial evidence that the defendant knowingly aided and abetted another's direct infringement. Water Technologies Corp. v. Calco, Ltd., 850 F.2d 660, 668 (Fed. Cir. 1988), cert. denied, 484 U.S. 968 (1988).

a. **Did Roche Induce GI To Make The EPO Production Clone, MCB, Or MWCB?**

Columbia alleges that Roche induced GI to infringe the Axel patents by inducing GI to create the DN2-3α3, 10 micromolar EPO production clone, MCB, and MWCB. However, regardless of whether GI directly infringed the Axel patents with its making of these

[16] During the jury waived trial, I analogized the differences between an accessory before the fact and one who receives stolen property. Section 271(b) only targets an active participant (effectively, the accessory) and not the passive recipient (i.e. the "fence").

cells, Roche is not liable for any infringement by GI because it did not induce GI to create these cells.

GI had begun its research into developing a commercially feasible EPO production clone even before its first contact with Roche in 1984 and continued this work throughout 1985. Weeks before it signed the GI-Roche D&L Agreement on October 8, 1985, GI had begun work on the DN2-3α3, 10 micromolar EPO production clone. GI had an outstanding obligation to Chugai to produce this EPO production clone in order to meet its duties under the GI-Chugai License Agreement to Chugai. Although the clone was not transferred from the cell line production lab to the cell culture lab to be adapted to grow in suspension culture until October 10, 1985, GI created the EPO production clone prior to its being adapted to suspension culture. Thus, I am satisfied that the production clone was virtually finished prior to the signing of the GI-Roche D&L Agreement on October 8, 1985. While GI attempts to point to a March 1985 "agreement in principle" between the parties as evidence that Roche's inducement began before the parties signed the GI-Roche D&L Agreement, any agreement between the parties at that point was too tentative to hold Roche liable for GI's actions as an accessory before the fact with the specific intent to induce GI to infringe the Axel patents.

Similarly, I find that Roche did not induce GI to infringe the Axel patents by creating the MCB or MWCB. The cells of the MCB were not "laid down," that is, frozen and put into individual vials, until December 4, 1985; the MWCB was not laid down until December 18, 1985. However, once again, GI had completed over ninety percent of the work to produce the MCB and MWCB prior to the dates that they were laid down. Under these circumstances, I cannot find that Roche induced GI to infringe the Axel patents by creating these cells.

b. **Did Roche Induce GI To Make Bulk EPO?**

My conclusions are different with respect to the question of whether Roche induced GI to make the bulk EPO that GI shipped to it between 1986 and 1991.[17] Roche makes three arguments:

First, Roche argues that GI would have made the bulk EPO to supply a European company to finish the clinical development of the drug and market the drug in Europe, even without Roche's involvement. Accordingly, Roche cannot be held responsible for inducing GI to make the bulk EPO. To be sure, GI did negotiate with at least two other European companies in addition to Roche. However, there is no conclusive evidence that GI would have

[17] Roche conceded at trial that GI's use of the cell line, the production clone, to make bulk EPO would infringe Columbia's claims if the making of the cell line itself infringed those claims. Trial Tr. 785.

produced the bulk EPO that it produced without Roche's involvement in the project.

In a related argument, Roche argues that it did not induce GI into making bulk EPO because GI was already committed to produce bulk EPO for Chugai as a result of its contract with Chugai before Roche and GI signed the GI-Roche D&L License Agreement. In February 1986, GI did ship vials of the MCB and the MWCB of the DN2-3α3, 10 micromolar EPO production clone to Chugai in Japan pursuant to the GI-Chugai License Agreement. However, under the GI-Chugai License Agreement, GI did not retain any rights to manufacture bulk EPO. Instead, under the agreement, GI was to supply Chugai with the cell lines and a sample of expressed and purified EPO, and Chugai would manufacture the bulk EPO product in Japan for itself. In contrast, under the GI-Roche D&L Agreement, GI retained rights to manufacture bulk EPO for Roche with Roche's support.

Next, Roche argues that it did not induce GI's production of bulk EPO because it did not control the details of GI's processes to produce the bulk EPO. Without this hands-on control over GI's infringing actions, it could not have possessed the specific intent necessary to induce infringement under the Manville Sales test. Instead, relying on Keplinger v. De Young, 23 U.S. 358, 365-366 (1825), Roche styles itself as a mere purchaser of goods

who is not liable for purchasing a product that a third party happened to make with an infringing process, utilizing the "receiver of stolen property" analogy.

However, while control over a third party infringer's actions is relevant evidence as whether a defendant has induced that third party to directly infringe, control is not a necessary condition for a finding of inducement liability. In VLT Corp. v. Unitrode Corp., 130 F. Supp. 2d 178, 200-201 (D. Mass. 2001), the court examined the relevant Federal Circuit precedent of Hewlett-Packard Co. v. Bausch & Lomb, Inc., 909 F.2d 1464 (Fed. Cir. 1990) and Water Technologies Corp. to reject this argument that an inducing defendant must have some control over the design, manufacture, or marketing of an infringing device to be held liable under Section 271(b).

Admittedly, Roche did not exert control over the specifics of how GI would manufacture the bulk EPO that GI would provide to it under their agreement. GI produced the EPO according to GMP standards, a set of guidelines established by the FDA and other regulatory agencies that drug manufacturers need to follow if the drug is going to be used by humans. While Roche had an independent responsibility for ensuring that GI used GMP practices in manufacturing the bulk EPO, it did not tell GI how

to meet those requirements or supervise GI's production in any detailed way.

As explained above, however, whether Roche immediately supervised the production of the bulk EPO is not dispositive. As long as Roche encouraged GI to take actions that it knew or should have known would infringe the Axel patents with the requisite specific intent, Roche is liable under Section 271(b). The key question is not whether Roche controlled GI's actions, but whether Roche encouraged those actions with the requisite prior knowledge and specific intent to infringe. I conclude that it did.

Finally, Roche argues that it did not induce GI into making the bulk EPO because it never encouraged GI to make the bulk EPO in the first place. It argues that Roche wanted to make the bulk EPO itself in Germany and only consented to GI making the bulk EPO for it as a concession to GI under the GI-Roche D&L License Agreement. Under the GI-Roche D&L License Agreement, GI had the exclusive right to manufacture a minimum of 100% of Roche's bulk EPO for the first three years of the contract, 85% for year four, 65% for year five, and 50% for the remainder of the contract. Trial Ex. P29 at B100111. However, although Roche's first option may have been to manufacture the bulk EPO itself in Germany, the bargain it entered into said otherwise.

The details of the relationship between GI and Roche as defined by the GI-Roche D&L License Agreement demonstrate that Roche was intimately involved with inducing GI to make bulk EPO. Roche was more than a mere purchaser of goods who arrived on the scene after GI finished creating the bulk EPO. As a part of the GI-Roche D&L License Agreement, Roche agreed to fund GI's research and development. Trial Ex. P29 at ¶ 3.1. "In consideration of the research, development, and related activities undertaken by GI with regard to the project," Roche agreed to pay GI a series of non-refundable research fees when GI reached certain development benchmarks. Id. The Agreement also authorized the exchange of confidential trade secrets and included a provision for joint ownership: "the Parties shall own jointly the entire right, title and interest in and to all patent and other rights in any product method or apparatus conceived, reduced to practice or developed jointly by GI and BM in the course of the Project." See id. at ¶¶ 2.6 & 5.3. As this Court previously explained:

> . . . BMG's D & L Agreement was not merely a contract to purchase goods in Massachusetts for delivery outside of Massachusetts. Rather it created, by its own wording, a "collaboration" between the two companies. Although it appears that only GI personnel actually performed experimental or production work in Massachusetts, BMG's connection with that work was more intimate than that of a

> mere customer. BMG was the principal underwriter of the research in question. If the research produced valuable technology, BMG was to have an exclusive license to use the technology outside the United States. Moreover, BMG retained, under the D & L agreement, the right to prosecute foreign patent applications on any technology developed by GI which GI failed to prosecute itself.

Trustees of Columbia University, 35 U.S.P.Q.2d at 1368.

In this case, GI had not fully developed the bulk EPO before Roche and GI agreed to collaborate. In addition, unlike the creation of the DN2-3α3, 10 micromolar EPO production clone, the MCB, or the MWCB, GI had not virtually completed its production of the bulk EPO before beginning its relationship with Roche. To the contrary, GI did not send its first shipment of GMP bulk EPO to Roche in Germany until July 1986, nine months after the parties entered into their Agreement in October 1985. Prior to Roche's involvement, GI had not completed its production of the bulk EPO that it sent to Roche, and Roche's research funding, royalty payments, and support clearly encouraged GI to utilize the EPO production clone, MCB, and MWCB to do so.

With respect to the creation of the bulk EPO, Roche acted as an accessory before the fact with full knowledge that GI would utilize the EPO production clone, MCB, and MWCB to manufacture the bulk EPO. Therefore, because Columbia has shown that GI

directly infringed the Axel patents by creating these cell lines,[18] and because Roche possessed the specific intent necessary to be held culpable for inducing this infringement by encouraging GI's production of bulk EPO, Roche induced GI to make bulk EPO in violation of Section 271(b). In doing so, it induced GI to infringe the linked claims (claims 54-73) of the '216 patent (see Section III(A)(1)(b), supra).

c. Did Roche Induce GI to Freeze and Store the Epo Production Clone after GI Was Enjoined from Producing EPO?

Columbia also alleges that Roche induced GI to store and maintain its EPO production clone in a frozen state of suspended animation since GI was enjoined from producing EPO in 1991. However, even if this act by GI did directly infringe the Axel patents -- and it is not at all clear that it did -- Columbia has presented no evidence to support its claim that Roche induced this allegedly infringing act, and therefore, Roche cannot be held liable for GI's actions in this instance.

3. Did Roche Directly Infringe The Axel Patents Under 35 U.S.C. § 271(g)?

Columbia alleges that Roche directly infringed its patents by importing products made using the Axel patents into the United States. See 35 U.S.C. 271(g) ("Section 271(g)") (providing that

[18] Whether GI's actions in creating these cell lines directly infringed the Axel patents is discussed in Section III(A)(1)(b)-(c), supra.

"[w]hoever without authority imports into the United States or offers to sell, sells, or uses within the United States a product which is made by a process patented in the United States shall be liable as an infringer. . . ." Columbia argues that Roche violated Section 271(g) when it shipped albumin-free EPO to GI in the United States in March 1989 and when it returned GI's "bailed" vials of the MWCB, also in early 1989. Columbia argues that GI made both the albumin-free EPO and the "bailed" vials of the MWCB by utilizing and directly infringing its patented processes. Columbia further alleges that Roche imported these products into the United States without authority from Columbia in violation of Section 271(g).

a. **Importing Albumin-Free EPO**

Roche makes two arguments to refute Columbia's claim of liability under Section 271(g) with respect to its shipping albumin-free EPO to GI in the United States. First, it argues that because GI (and not Roche) manufactured the albumin-free EPO, it cannot be held liable under Section 271(g). Unfortunately for Roche, it is irrelevant under Section 271(g) who manufactured the goods so long as the goods were manufactured using a patented process. Instead, under the statute, liability attaches to one who, without authority, imports a product made by a patented process into the United States. The defendant need